

WE CLAIM:

1. A sensing apparatus for monitoring temperature generated by an ablation apparatus on organic tissue, comprising:
a temperature-sensing pad; and
an output device in communication with the pad, the output device operatively adapted to receive and display a representation of a lesion found on the organic tissue.
2. The apparatus of claim 1 wherein the pad comprises temperature-sensing elements incorporated therein.
3. The apparatus of claim 2 wherein the temperature-sensing elements are arranged in a grid pattern.
4. The apparatus of claim 3 wherein the output device displays a representation of the grid pattern.
5. The device of claim 1 wherein the output device includes a processor for processing a signal received from the temperature-sensing pad.
6. The device of claim 1 wherein the output device includes an amplifier for amplifying a signal received from the temperature-sensing pad.
7. The apparatus of claim 2 wherein the temperature-sensing elements are thermocouples.

8. The apparatus of claim 2 wherein the temperature-sensing elements are thermisters.

9. The apparatus of claim 2 wherein the temperature-sensing elements are temperature-sensing liquid crystals.

10. The apparatus of claim 2 wherein the temperature-sensing elements are temperature-sensing chemicals.

11. The apparatus of claim 2 wherein the temperature-sensing elements are operatively adapted to be located within the tissue.

12. The apparatus of claim 1 wherein the pad is mounted on a glove.

13. The apparatus of claim 1 wherein the pad is formed as a portion of a glove.

14. The apparatus of claim 1 wherein the pad is operatively adapted to be fitted over a finger.

15. The apparatus of claim 1 wherein the pad further comprises a conductive element incorporated therein.

16. The apparatus of claim 1 wherein the output device comprises a visual display on a monitor.

17. The apparatus of claim 1 wherein the output device comprises a visual display on the pad.

18. A system for assessing transmuralty of an ablation in a tissue comprising:

an ablation apparatus operatively adapted to ablate a first side of the tissue;

a temperature-sensing pad operatively adapted to sense temperature along a second side of the tissue; and

an output device in communication with the pad, the output device operatively adapted to indicate the temperature of the tissue.

19. The system of claim 18 wherein the pad comprises temperature-sensing elements incorporated therein.

20. The system of claim 18 wherein the temperature of the tissue indicated by the output device corresponds to transmuralty of the lesion.

21. A method of ablating organic tissue comprising the steps of:
providing a temperature-sensing pad operatively adapted to sense a temperature of the tissue and an output device in communication with the pad, the output device operatively adapted to display a representation of a lesion found on a back side of the tissue;
positioning the pad against a back side of the tissue;
ablating the tissue with an ablation apparatus against a front side of the tissue;
sensing the temperature changes of the ablated tissue with the pad; and
ablating the tissue in accordance with the temperature changes.
22. The method of claim 21 further comprising:
viewing the representation of the lesion; and
correlating the temperature changes of the ablated tissue with the representation of the lesion.
23. An apparatus for monitoring temperature generated by an ablation apparatus on organic tissue comprising:
a temperature sensing pad incorporating a plurality of temperature-sensing liquid crystals therein; and
an output device in communication with the pad, the output device operatively adapted to receive and display a representation of a lesion found on the organic tissue.

24. The apparatus of claim 23 wherein the representation comprises a color scheme in which each color indicates a temperature.

25. An apparatus for monitoring temperature generated by an ablation apparatus on organic tissue comprising:

a finger pad comprising a plurality of temperature-sensing elements therein, the finger pad formed to conform to a finger; and

an output device in communication with the finger pad, the output device operatively adapted to receive and display a representation of a lesion found on the organic tissue.

26. The device of claim 25 wherein the output device is the finger pad, the finger pad operatively adapted to receive and display a representation of a lesion found on the organic tissue.

27. A system for assessing transmuralty of an ablation in a tissue comprising:

an ablation apparatus operatively adapted to ablate a first side of the tissue;

a temperature-sensing pad operatively adapted to sense temperature along a second side of the tissue;

a conductive element attached to the pad; and

an output device in communication with the pad, the output device operatively adapted to indicate the temperature of the tissue.

28. An ablation system for creating a tissue ablation site, the system comprising:

an energy source;

an ablation device operatively coupled to the energy source, the ablation device comprising one or more energy transfer elements positioned along a tissue contact surface of the ablation device; and

a sensor device operatively coupled to the energy source, the sensor device including a sensor adapted to sense a temperature parameter relating to the tissue ablation site, the sensor device having a tissue contact surface, one or more suction openings positioned along the tissue contact surface of the sensor device, and a suction conduit for providing suction from a suction source to the one or more suction openings, the suction conduit being operatively connected with the one or more suction openings.

29. The system of claim 28 wherein the ablation device further comprises one or more suction openings positioned along the tissue contact surface and a suction conduit for providing suction from a suction source to the one or more suction openings, the suction conduit operatively connected with the one or more suction openings.

30. The system of claim 28 wherein the ablation device further comprises an irrigation fluid conduit for providing irrigation fluid from an irrigation source to the tissue ablation site.

31. The system of claim 30 wherein the irrigation fluid is an energy-conducting liquid.

32. The system of claim 30 wherein the irrigation fluid comprises one or more diagnostic or therapeutic agents.

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33. The system of claim 30 wherein the sensor further comprises a means for varying irrigation fluid supplied to the irrigation conduit in response to the sensed temperature parameter.

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34. The system of claim 28 wherein the ablation device further comprises a maneuvering apparatus operatively connected with the tissue contact surface of the ablation device for maneuvering the energy transfer element.

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35. The system of claim 34 wherein the maneuvering apparatus includes at least one pull wire.

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36. The system of claim 34 wherein the maneuvering apparatus includes a handle.

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37. The system of claim 36 wherein the handle comprises one or more hinges or joints.

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38. The system of claim 37 wherein the one or more hinges or joints are actuated remotely.

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39. The system of claim 38 wherein the handle is shapeable.

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40. The system of claim 28 wherein the sensor device further comprises a maneuvering apparatus operatively connected with the tissue contact surface of the sensor device for maneuvering the sensor.

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41. The system of claim 40 wherein the maneuvering apparatus includes at least one pull wire.

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~~42~~. The system of claim ~~40~~¹³ wherein the maneuvering apparatus includes a handle.

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~~43~~. The system of claim ~~42~~¹⁵ wherein the handle comprises one or more hinges or joints.

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~~44~~. The system of claim ~~43~~¹⁶ wherein the one or more hinges or joints are actuated remotely.

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~~45~~. The system of claim ~~42~~¹⁵ wherein the handle is shapeable.

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~~46~~. The system of claim ~~28~~¹ wherein the sensor device further comprises an output device for alerting or informing a practitioner regarding the temperature parameter relating to the tissue ablation site sensed by the sensor device.

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~~47~~. The system of claim ~~28~~¹ further comprising a generator operatively connected to the energy source.

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~~48~~. The system of claim ~~47~~²⁰ wherein the generator includes a control unit or processor.

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~~49~~. The system of claim ~~28~~²¹ wherein the energy source is an RF energy source.

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~~50~~. The system of claim ~~28~~²¹ wherein the energy source is an electrical energy source.

24/ 51. The system of claim 28 wherein the energy source is a laser energy source.

25/ 52. The system of claim 28 wherein the energy source is a thermal energy source.

26/ 53. The system of claim 28 wherein the energy source is a microwave energy source.

27/ 54. The system of claim 28 wherein the energy source is an ultrasound energy source.

28/ 55. The system of claim 28 further comprising a means for varying energy supplied by the energy source to the energy transfer elements in response to the sensed temperature parameter.

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